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09/553,990	04/20/2000	Youhao Xu	456962000200	5903
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EXAMINER				
LEUNG, JENNIFER A				
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1764				

DATE MAILED: 11/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/553,990

Applicant(s)

XU ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's amendment filed on August 21, 2003 has been received and carefully considered. The changes made to the specification are acceptable. Claims 1-8 remain active.

### *Claim Objections*

2. Claim 1 is objected to because the term "reactor zone" (lines 12 and 18) should be changed to -- reaction zone -- for consistency in claim terminology, as set forth in lines 8 and 13. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 1, it is unclear as to the structural limitation applicants are attempting to recite by,

"... the first reaction zone is *configured so that* a hydrocarbon cracking reaction taking place in the first reaction zone takes place at higher reaction temperatures, higher ratios of catalyst to oil, and shorter reaction times than, respectively, a reaction temperature, ratio of catalyst to oil, and reaction time in a second reactor zone..." (lines 9-12),

since it is unclear as to the corresponding structural element(s) that enable the claimed apparatus to exhibit the recited process limitations of a higher reaction temperature, a higher ratio of C/O and a shorter reaction time within the first reaction zone. Similarly, it is unclear as to the structural limitation applicants are attempting to recite by,

“... the second reaction zone is *configured so that* a hydrocarbon cracking reaction taking place in the second reaction zone takes place at a lower reaction temperature, lower ratio of catalyst to oil, and longer reaction time than, respectively, the reaction temperature, ratio of catalyst to oil, and reaction time in the first reactor zone...” (lines 15-18),

since it is unclear as to the corresponding structural element(s) that enable the claimed apparatus to exhibit the recited process limitations of a lower reaction temperature, a lower ratio of C/O and longer reaction time within the second reaction zone. (i.e., Are these properties *inherent* of the apparatus, by virtue of the diameter of the second reaction zone being larger than the first reaction zone? Are these properties *inherent* of the apparatus, by virtue of the placement of catalyst and/or other feed lines? Is applicant attempting to claim a built-in heat exchanger and/or quenching mediums, as disclosed on page 5, second paragraph?)

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Cabrera (US 4,859,424).

Cabrera (FIG. 2; column 7, lines 6-31), as best understood, discloses a riser reactor having a substantially vertical linear axis, a riser reactor height, a reactor bottom and a reactor top, wherein the riser reactor comprises, in order from the reactor bottom,

- a) a prelift zone (i.e., pipeline 68) having a prelift zone diameter and height;
- b) a first reaction zone (i.e., unlabeled riser zone immediately downstream from pipeline 68, communicating with WYE section 66) having a first reaction zone diameter and height;

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- c) a second reaction zone (i.e., external riser section **70**) having a second reaction zone height and a diameter that is larger than the first reaction zone diameter; and
- d) an outlet zone (i.e., internal riser **72**) having an outlet zone diameter that is reduced with respect to the second reaction zone **70** diameter.

Further defining the functional limitations as claimed in lines 9-12 and 15-18, the specification (page 5, lines 11-13) recites,

“... the feedstock is contacted with hot catalyst in the first reaction zone *with the result that* the primary cracking reaction takes place at higher reaction temperature, higher C/O ratio and shorter reaction time...” (with emphasis added).

Similarly, Cabrera discloses an apparatus wherein the feedstock (introduced via pipe **68**) is contacted with the hot catalyst (introduced via WYE section **66**) within the first reaction zone (unlabeled). Thus, the apparatus of Cabrera meets the claims, since the first reaction zone will, *inherently*, be configured for a higher reaction temperature, a higher ratio of catalyst-to-oil, and a shorter reaction time than, respectively, a reaction temperature, ratio of catalyst-to-oil, and reaction time in a second reaction zone **70**, by virtue of the placement of the hot catalyst **66** and feedstock **68** inlets, as well as the enlarged second reaction zone **70** diameter with respect to the first reaction zone (unlabeled) diameter.

Instant claim 1 structurally reads on the apparatus of Cabrera.

- 5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Weinberg et al. (US 5,196,172).

Weinberg et al. (column 9, line 49 to column 10, line 14), as best understood, discloses a riser reactor (TWO-STAGE RISER REACTOR; FIG. 1) having a substantially vertical linear axis, a riser reactor height, a reactor bottom and a reactor top, wherein the riser reactor

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comprises, in order from the reactor bottom,

- a) a prelift zone (i.e., lift gas **3a** zone) having a prelift zone diameter and height;
- b) a first reaction zone (i.e., lift section **3**) having a first reaction zone diameter and height;
- c) a second reaction zone (i.e., vaporization zone **5**; riser reactor zone **8**) having a second reaction zone height and a diameter that is larger than the first reaction zone **3** diameter; and
- d) an outlet zone (i.e., riser terminus zone **9** within stripper **12**) having an outlet zone diameter reduced with respect to the second reaction zone **5/8** diameter.

Further defining the functional limitations as claimed in lines 9-12 and 15-18, the specification (page 5, lines 11-13) recites,

“... the feedstock is contacted with hot catalyst in the first reaction zone *with the result that* the primary cracking reaction takes place at higher reaction temperature, higher C/O ratio and shorter reaction time ...” (with emphasis added).

Additionally, the specification (page 5, lines 17-19) recites,

“When the temperature of [the second reaction] zone must be maintained at lower temperature, *a quenching medium can be introduced* into the conjunct section between [the second reaction] zone and the first reaction zone...” (with emphasis added).

Similarly, Weinberg et al. discloses an apparatus wherein feedstock (i.e., lift gas from **3a**) is contacted with a hot regenerated sorbent (i.e., heated in the order of 1250 F to 1600 F; column 8, lines 53-63) introduced via transfer line **2** to the first reaction zone **3**. Also, a quenching medium comprising feed hydrocarbon and steam is introduced via nozzles **4** into the conjunct section **4a** between the second reaction zone **5/8** and the first reaction zone **3**. Thus, the apparatus of Weinberg meets the claims, since the first reaction zone **3** will, *inherently*, be configured for a higher reaction temperature, a higher ratio of catalyst-to-oil, and a shorter reaction time than, respectively, a reaction temperature, ratio of catalyst-to-oil, and reaction time in a second

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reaction zone 5/8, by virtue of the placement of the feedstock **3a** and sorbent **2** inlets, the provision of a quenching medium in the first conjunct section **4a**, and the enlarged second reaction zone 5/8 diameter with respect to the first reaction zone **3** diameter.

Instant claim 1 structurally read on the apparatus of Weinberg et al.

6. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Luckenbach (US 2,963,421).

Regarding claim 1, Luckenbach (Figure; column 2, lines 20-35; column 3, lines 4-60), as best understood, discloses a riser reactor (**PRIMARY REACTOR**) having a substantially vertical linear axis, a riser reactor height, a reactor bottom and a reactor top, wherein the riser reactor comprises, in order from the reactor bottom,

- a) a prelift zone (i.e., the bottom portion of the narrower, vertically disposed conduit, communicating with tap **21**) having a prelift zone diameter and height;
- b) a first reaction zone (i.e., the upper portion of the narrower, vertically disposed conduit, immediately downstream from the prelift zone) having a first reaction zone diameter and height;
- c) a second reaction zone (i.e., the wider, vertically disposed conduit, immediately downstream from the first reaction zone, labeled with **10**) having a second reaction zone height and a diameter that is larger than the first reaction zone diameter; and
- d) an outlet zone (i.e., the overhead, vertically disposed conduit, immediately downstream from the second reaction zone) having an outlet zone diameter that is reduced with respect to the second reaction zone diameter.

Further defining the functional limitations as claimed in lines 9-12 and 15-18, the specification (page 5, lines 11-13) recites,

“... the feedstock is contacted with hot catalyst in the first reaction zone *with the result that* the primary cracking reaction takes place at higher reaction temperature, higher C/O ratio and shorter reaction time...” (with emphasis added).

Additionally, the specification (page 5, lines 17-19) recites,

“When the temperature of [the second reaction] zone must be maintained at lower temperature, *a quenching medium can be introduced* into the conjunct section between [the second reaction] zone and the first reaction zone...” (with emphasis added).

Similarly, Luckenbach discloses an apparatus wherein feedstock is contacted with hot catalyst (i.e., as introduced via lines **21, 25**) within the first reaction zone (see Figure). Also, a quenching medium is shown as being introduced (i.e., via nozzles **24**) into the conjunct section between the second reaction zone and the first reaction zone (see Figure). Thus, the apparatus of Luckenbach meets the claims, since the first reaction zone will, *inherently*, be configured for a higher reaction temperature, a higher ratio of catalyst-to-oil, and a shorter reaction time than, respectively, a reaction temperature, ratio of catalyst-to-oil, and reaction time in a second reaction zone, by virtue of the placement of feedstock and catalyst inlets **21/25**, the provision of quenching medium **24** to the first conjunct section, and the enlarged second reaction zone diameter with respect to the first reaction zone diameter.

Regarding claim 2, Luckenbach discloses the total height of said prelift zone, said first reaction zone, said second reaction zone, and said outlet zone is in the range of from about 10 meters to about 60 meters (i.e., specifically, 70 - 180 feet; column 6, TABLE II).

Instant claims 1 and 2 structurally read on the apparatus of Luckenbach.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.



This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luckenbach (US 2,963,421).

Regarding claim 3, Luckenbach discloses *by illustration* a prelift zone height roughly equal to about 5% of the height of the riser reactor (see Figure). Additionally, Luckenbach discloses that the *exact* diameter of reactor 10 lies within the range of 2-15 feet (i.e., 0.6 m to 4.7 m; Table II). Given that the maximum diameter is less than the instantly recited diameter of 5 meters, and the minimum diameter is greater than the instantly recited diameter of 0.02 meters, the prelift zone diameter *inherently* lies within the recited range of about 0.02 meters to about 5 meters. Although the reference is silent as to the *exact* range for the prelift zone height, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate height (i.e., such as the instantly recited height) for the prelift zone in the apparatus of Luckenbach, on the basis of suitability for the intended use, since changes in size involves only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

Regarding claim 4, Luckenbach discloses *by illustration* a first reaction zone diameter roughly equal to the prelift zone diameter (and hence, a ratio of about 1:1), and further discloses *by illustration* a first reaction zone height roughly equal to about 30% of the height of the riser

reactor (Figure). Although the reference is silent as to disclosing the *exact* ranges for the ratio of first reaction zone diameter to prelift zone diameter, or the first reaction zone height, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select appropriate dimensions (i.e., such as the instantly recited dimensions) for the first reaction zone relative to the prelift zone diameter and riser reactor height in the apparatus of Luckenbach, on the basis of suitability for the intended use, since changes in size involves only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

Regarding claim 5, Luckenbach discloses *by illustration* a second reaction zone diameter roughly twice as large as the first reaction zone diameter (and hence, a ratio of about 2:1), and further discloses *by illustration* a second reaction zone height of about 60% of the height of the riser reactor (see Figure). Although the reference is silent as to disclosing the *exact* ranges for the ratio of the second reaction zone diameter to the first reaction zone diameter, or the second reaction zone height, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select appropriate dimensions (i.e., such as the instantly recited dimensions) for the second reaction zone relative to the first reaction zone diameter and the riser reactor height in the apparatus of Luckenbach, on the basis of suitability for the intended use, since changes in size involves only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

Regarding claim 6, Luckenbach discloses *by illustration* a outlet zone diameter roughly equal to the first reaction zone diameter (and hence, a ratio of about 1:1), and further discloses *by*

*illustration* an outlet zone height of about 5% the height of the riser reactor (see Figure).

Although the reference is silent as to disclosing the *exact* ranges for the ratio of the outlet zone diameter to the first reaction zone diameter, or the outlet zone height, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select appropriate dimensions (i.e., such as the instantly recited dimensions) for the outlet zone relative to the first reaction zone diameter and the riser reactor height in the apparatus of Luckenbach, on the basis of suitability for the intended use, since changes in size involves only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

Regarding claims 7 and 8, Luckenbach discloses a first junction section between said first reaction zone and said second reaction zone, and a second junction section between said second reaction zone and said outlet zone, wherein the junction sections both comprise circular truncated cone shapes (see Figure). Although the reference is silent as to the *exact* vertex angle defined by each of the junction sections, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate vertex angle (i.e., such as the instantly recited vertex angles) for the first and second junction section in the apparatus of Luckenbach, on the basis of suitability for the intended use, since changes in size involves only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

#### ***Response to Arguments***

8. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection, as necessitated by amendment.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


\* \* \*

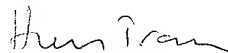
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951\*\*. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

*\*\* As of December 10, 2003, the telephone number will be changed to 571-272-1449.*

Jennifer A. Leung  
November 14, 2003 

  
HIEN TRAN  
PRIMARY EXAMINER